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TO: Assistant Commissioner for Patents Washington, D.C. 20231	ATTY. DKT. NO. P722CONT
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PATENT APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of:

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TITLE: VIDEO, DATA AND TELEPHONY GATEWAY

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Enclosed are the following papers required for a filing date under 35 CFR §1.53(b):


- ☒ Specification 15 pages
- ☒ Claims 25 pages
- ☒ Abstract 1 pages
- ☒ Drawings 7 sheets ☐ formal ☒ informal

The following additional papers are enclosed:

- ☐ Fee Transmittal
- ☒ Declaration and Power of Attorney
- ☐ Verified Statement(s) of Small Entity Status ☐ Independent Inventor ☐ Small Business
- ☐ Non-Profit ☐ Other
- ☐ Information Disclosure Statement ☐ Form PTO-1449
- ☐ Assignment and Cover Sheet

Remarks: The Declaration and Power of Attorney is a copy of the Declaration and Power of Attorney from the parent application. The copy is sufficient as the continuation adds no new matter and has identical inventors.

Dated: 1/20/00

  
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CERTIFICATE OF MAILING (37 CFR 1.10)

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I hereby certify that the following *attached* paper or fee:

Patent Application; including Specification (15pp.), Claims (25pp.), Drawings (7pp.), and Abstract (1p.).

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Assistant Commissioner for Patents, Washington, D.C. 20231.

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**TITLE**

*Video, Data and Telephony Gateway*

This application is a continuation of U.S. Continued  
5 Prosecution Application (CPA) 09/026,036 filed on October 12,  
1999, which was a continuation of U.S. Application 09/026,036  
filed on February 19, 1998 (now abandoned), which claimed the  
benefit of U.S. Provisional Application 60/038,276 filed on  
February 19, 1997. These applications are herein incorporated by  
10 reference.

**Field of the Invention**

The present invention relates to an apparatus for the  
distribution of video, data and telephony and other  
15 telecommunications services within a residence.

**Background of the Invention**

Advances in the field of telecommunications allow large  
amounts of digital information to be delivered to residences.  
20 Inside the residence, devices will be connected to the network by  
twisted wire pairs which provide telephone services today, or by  
coaxial cable similar to that used by cable operators to provide  
cable TV services.

Because the majority of new video services will be digital,  
25 and because existing televisions are analog, there is a  
requirement for a device which converts the digital signals  
supplied by the network to analog signals compatible with  
existing televisions. Presently available television set-tops can  
perform this function, but are expensive. Many homes have more  
30 than one television, and will therefore require multiple

television set-tops to receive digital programming at each location within the home.

A centrally located device can provide connectivity to the digital network as well as providing digital to analog

5 conversion, but methods of distributing the signals around the home are required. In addition, methods of communicating with the centralized device from the different locations in the home are required.

10 It is also desirable to have data and telephony services in the home, and it is likely that these services will be required in more than one location in the home. In addition, there may be the need for communicating between devices in the home.

For the foregoing reasons, there is a need for a centralized unit in the home which can provide video, data, and telephony  
15 services, and methods for communicating with the centralized unit from different locations within the home.

### **Summary Of The Invention**

In a preferred embodiment a centrally located gateway  
20 provides analog video services by receiving a digital data stream from a fiber-to-the-curb access system, and directing packets containing video signals to one or more digital video decompression processors. The video decompression processors generate analog video signals which are transmitted to  
25 televisions as S-video signals, or modulated onto carriers to produce broadcast type signals compatible with standard televisions.

In a preferred embodiment, the analog video signals which were generated from the digital network are combined with off-air  
30 or cable-TV broadcast signals for transmission to the televisions

in the residence using a splitter and in-home coaxial cable wiring. The digitally originated signals are modulated onto unused television channels. A low pass filter can be used to insure that the off-air or CATV signal has unused channels in the UHF spectrum.

Return signaling from the televisions in the gateway is provided for by use of wireless remote controls which signal back to the gateway for channel changes and other video signal controls.

In a preferred embodiment an optional module can be inserted into the gateway to provide a standard signal for devices in the residence which are designed to be connected directly to the FTTC access system with coaxial drop cables.

A CATV module can be inserted and provides for the mapping of television channels from a CATV network or antenna for off-air broadcasts to a channel for transmission over the in-home coaxial network. By using the CATV module it is possible to map signals to new channels as well as equalizing signal levels so that there are no large signal differences between the signal levels from the CATV network or antenna and the gateway.

An optional module can be inserted to provide telephony services from the gateway.

Data services can be provided from the gateway, and an Ethernet port is used to connect data devices such as computers to the gateway.

In an alternate embodiment a centralized gateway is connected to televisions in the residence by point-to-point coaxial wiring. A main video decompression processor receives video packets and constructs multiple analog video channels. The multiple analog video channels are made available to inserted

modules in the gateway through the use of analog video buses. Inserted video modules are used to modulate the video signals onto a channel which can be received by a television connected to the video module by point-to-point coaxial cable wiring.

5 In an alternate embodiment signaling from the remote locations in the home to the gateway is accomplished by use of an infrared transmitter and receiver. The receiver receives the infrared signals from the hand-held remote control and signals back the gateway via the in-home coaxial cable wiring. The  
10 infrared receiver can also be integrated into the television.

In an alternate embodiment the CATV module provides for the mapping of television channels from a CATV network or antenna for off-air broadcasts to a channel for transmission to an individual television. The CATV module places the analog television signal  
15 onto an analog video bus. Any one of the inserted TV modules can receive the signal from the bus and transmit that signal to a particular television.

These and other features and objects of the invention will be more fully understood from the following detailed description  
20 of the preferred embodiments which should be read in light of the accompanying drawings.

### **Brief Description Of The Drawings**

The accompanying drawings, which are incorporated in and  
25 form a part of the specification, illustrate the embodiments of the present invention and, together with the description serve to explain the principles of the invention.

In the drawings:

FIG. 1 illustrates a fiber-to-the-curb access system with  
30 coaxial drop cables;

FIG. 2 illustrates a fiber-to-the-curb access system with a gateway used in the residence for the distribution of video, data and telephony signals;

FIG. 3 illustrates a fiber-to-the-curb access system with  
5 twisted wire pair drop cable to a residence having a gateway;

FIG. 4 illustrates an architecture for a video, data and telephony gateway which uses point-to-multipoint in-home coaxial wiring;

FIG. 5 illustrates a wireless method of signaling from  
10 remote locations in a home to a gateway;

FIG. 6 illustrates an architecture for a video, data and telephony gateway which uses point-to-point in-home coaxial wiring; and

FIG. 7 illustrates a method for signaling from remote  
15 locations in the home to the gateway using the in-home coaxial wiring.

### **Detailed Description Of The Preferred Embodiments**

20 In describing a preferred embodiment of the invention illustrated in the drawings, specific terminology will be used for the sake of clarity. However, the invention is not intended to be limited to the specific terms so selected, and it is to be understood that each specific term includes all technical  
25 equivalents which operate in a similar manner to accomplish a similar purpose.

With reference to the drawings, in general, and FIGS. 1 through 7 in particular, the apparatus of the present invention is disclosed.

## Contents

### I. Fiber-to-the-curb networks

### II. Gateway with point-to-multipoint in-home coaxial wiring

### III. Gateway with point-to-point in-home coaxial wiring

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### I. Fiber-to-the-curb networks

FIG. 1 illustrates a Fiber-to-the-Curb (FTTC) network in which various devices in the residence 190 are connected to the Public Switched Telecommunications Network (PSTN) 100 or Asynchronous Transfer Mode (ATM) network 110. The devices in the residence 190 can include telephone 194, television (TV) 199 with a television set-top 198, computer with Network Interface Card (NIC) 191, and Premises Interface Device (PID) 196 connected to a telephone 194.

The FTTC network illustrated in FIG. 1 works by connecting a Host Digital Terminal (HDT) 130 to the PSTN 100 and ATM network 110. The PSTN-HDT interface 103 is specified by standards bodies, and in the U.S. are specified by Bellcore specification TR-TSY-000008, TR-NWT-000057 or TR-NWT-000303. The HDT 130 can also receive special services signals from private or non-switched public networks. The physical interface to the PSTN is twisted wire pairs carrying DS-1 signals, or optical fibers carrying OC-3 optical signals.

The interface to the ATM network-HDT interface 113 can be realized using an OC-3 or OC-12c optical interfaces carrying ATM cells. In a preferred embodiment, the HDT 130 has two OC-12c



broadcast ports, which can only receive signals carrying ATM cells, and one OC-12c interactive port which can receive and transmit signals.

An element management system (EMS) 150 is connected to the  
5 HDT 130 and is used to provision services and equipment on the FTTC network, in the central office where the HDT 130 is located, in the field, or in the residences. The EMS 150 is software based and can be run on a personal computer in which case it will support one HDT 130 and the associated access network equipment  
10 connected to it, or can be run on a workstation in which case multiple HDTs and access networks are supported.

Optical Network Units (ONUs) 140 are located in the serving area and are connected to the HDT 130 via optical fiber 160. Digital signals in a Synchronous Digital Hierarchy (SDH)-like  
15 format at a rate of 155 Mb/s are transmitted to and from each ONU 140 over optical fiber 160. In a preferred embodiment, optical fiber 160 is a single-mode fiber and a dual wavelength transmission scheme is used to communicate between the ONU 140 and the HDT 130.

20 A Telephony Interface Unit (TIU) 145 in the ONU 140 generates an analog Plain Old Telephony signal (POTs) which is transported to the residence 190 via a twisted wire pair drop cable 180. At the residence 190 a Network Interface Device (NID) 183 provides for high-voltage protection and serves as the  
25 interface and demarcation point between the twisted wire pair drop cable 180 and the in-home twisted pair wiring 181. In a preferred embodiment, the TIU 145 generates POTs signals for six residences 190, each having a twisted wire pair drop cable 180 connected to the ONU 140.

As shown in FIG. 1, a Broadband Interface Unit (BIU) 150 is located in the ONU 140 and generates broadband signals which contain video, data and voice information. The BIU 150 modulates data onto an RF carrier and transmits the data over a coaxial drop cable 170 to a splitter 177, and over in-home coaxial wiring 171 to the devices in the residence 190.

In a preferred embodiment, 64 ONUs 140 are served by an HDT 130. Each ONU serves 8 residences 190. In an alternate embodiment, each ONU 140 serves 16 residences 190.

As shown in FIG. 1, each device connected to the in-home coaxial wiring 171 will require an interface sub-system which provides for the conversion of the signal from the format on the in-home coaxial wiring 171 to the service interface required by the device. The PID 194 extracts time division multiplexed information carried on the in-home coaxial wiring 171 and generates a telephone signal compatible with a telephone 194. Similarly, the television set-top 198 converts digital video signals to analog signals compatible with a TV 199. The NIC card generates a computer compatible signal.

FIG. 2 illustrates the use of a gateway 200 to generate signals compatible with the devices in the home, which are connected to the gateway 200 via in-home twisted pair wiring 181 or in-home coaxial cable wiring 210 and a splitter 177. The connection to the splitter 177 is made using a gateway-splitter connection, which in a preferred embodiment is coaxial cable. A direct connection to a television 199 can be made using a gateway-television connection 205, which in a preferred embodiment is a four conductor cable carrying an S-video signal.

FIG. 3 illustrates a FTTC network which relies on twisted wire pair drop cables 180 instead of coaxial drop cables 170.

This embodiment is preferable when it is cost prohibitive to install coaxial drop cables from the ONUs 140 to the residences 190.

As shown in FIG. 3, a Universal Service Access Multiplexor (USAM) 340 is located in the serving area, and is connected to the HDT 130 via optical fiber 160. An xDSL modem 350 provides for the transmission of high-speed digital data over the twisted wire pair drop cable 180 to and from residence 190. Traditional analog telephone signals are combined with the digital signals for transmission to the residence 190 and a NID/filter 360 is used to separate the analog telephone signal from the digital signals. The analog telephone signal is sent to a telephone 194 over the in-home twisted pair wiring 181.

The digital signals pass through the NID/filter 360 to the gateway 200. The gateway 200 serves as the interface to the devices in the residence 190 including the television 199, the computer 193, and the additional telephone 194.

The central office configuration illustrated in FIG. 3 includes a Universal Service Access Multiplexor Central Office Terminal (USAM COT) 324 connected to the HDT 130 via a USAM COT-HDT connection 325, which in a preferred embodiment is an STS3c signal transmitted over a twisted wire pair. The PSTN-USAM COT interface 303 is one of the Bellcore specified interfaces including TR-TSY-000008, TR-NWT-000057 or TR-NWT-000303.

A Channel Bank (CB) 322 is also used in the central office to connect specials networks 310, comprised of signals from special private or public networks, to the access system via the specials networks-CB interface 313. In a preferred embodiment, the CB-USAM COT connection 320 are DS1 signals over twisted wire pairs.

When used herein the term subscriber network refers in general to the connection between the ONU 140 and the devices or the gateway 200 in the residence 190 or the connection between the USAM 340 and the devices or the gateway 200 in the residence 190. The subscriber network may be comprised of coaxial cable and a splitter 177, twisted wire pairs, or any combination thereof.

Although FIG. 2 and FIG 3 illustrate the gateway 200 located inside the living area of residence 190, the gateway can be located in the basement, in the garage, in a wiring closet, on an outside wall of the residence 190, in the attic, or in any of the living spaces. For outside locations, the gateway 200 will require a hardened enclosure and components which work over a larger temperature range than those used for the gateway 200 located inside the residence 190. Techniques for developing hardened enclosures and selecting temperature tolerant components are known to those skilled in the art.

## **II. Gateway with point-to-multipoint in-home coaxial wiring**

FIG. 4 illustrates a gateway 200 which can be used with point-to-multipoint in-home wiring such as that created by the gateway-splitter connection 210, the splitter 177, and in-home coaxial wiring 171, as illustrated in FIGs. 2 and 3.

The gateway 200 of FIG. 4 is comprised of a Network Interface Module (NIM) 410 which connects to the access network through a network connection 460. The access network may have a coaxial drop cable 170 for digital services as illustrated in FIG. 2, or may have a twisted wire pair drop cable 180, as illustrated in FIG. 3. The NIM 410 will contain the appropriate modem technology for the access network. In a preferred

embodiment, different types of NIMs are utilized for access networks having coaxial drop cables than for access networks having only twisted wire pair drops.

The NIM 410 interfaces to a mother board 414 which provides the basic functionality of the gateway 200. The mother board 414 contains a microprocessor 434, memory 436, a power supply 440 connected to an AC outlet via an AC plug 476, a main MPEG processor 430, an Ethernet block 438 which connects to an Ethernet connector 478, and a Remote control block 442.

Within the main MPEG processor 430 there is a Video Segmentation and Reassembly (VSAR) section 432 which constructs MPEG packets from an ATM stream received from the NIM 410. The VSAR section 432 can reduce jitter in MPEG packets which arises from transmission of those packets over the ATM network, as well as constructing a useable MPEG stream in spite of lost ATM cells which contain partial MPEG packets.

The main MPEG processor 430 has an interface to an S video connector 474 which provides connectivity for televisions having an S video port.

The remote control block 442 has an interface to an IR receiver 472 which can receive commands from a hand-held remote control which is operated within the vicinity of the gateway 200. The remote control block 442 also has an interface to a UHF receive antenna 470 which can receive commands from hand-held wireless remotes used anywhere in the residence 190.

A set of buses 429 is used to route information within the gateway 200, and as illustrated in FIG. 4 includes a Time Division Multiplexing (TDM) bus 420, a control bus 422, a MPEG bus 424, and an ATM bus 428.

A number of optional modules can be inserted into the gateway 200 including MPEG modules 450, a DAVIC module 452, and a telephony module 454. All of the optional modules are connected to the control bus 422 in addition to being connected to at least one other bus which provides those modules with the appropriate types of data for the services supported by the module.

The MPEG modules 450 provide for decompression of MPEG packets which are constructed by the VSAR section 432. The output of the MPEG module 450 is a signal which is compatible with present televisions, which in the U.S. is the NTSC format. The MPEG module 450 can modulate the decompressed analog format video signal onto an available channel for transmission to the televisions 199 in the residence 190.

The DAVIC module 452 transmits and receives ATM cells to devices in the residence 190 over the in-home coaxial wiring 171, in a format which is identical to that used by the access system with coaxial drop cables illustrated in FIG. 1. The advantage of using the DAVIC module 452 is that the gateway 200 is compatible with in-home devices which connect directly to the access system as shown in FIG. 1.

The MPEG modules 450 and the DAVIC module 452 are connected to a combiner 418 which combines the RF signals from those modules, and can add other RF signals such as off-air broadcast television signals or Community Antenna Television (CATV) signals supplied by a cable television company. Signals from the antenna or cable system are coupled to a RF pass-through 464, which in a preferred embodiment is an F-connector. A low pass filter 482 is used in the combiner 418 to insure that the frequencies used by the MPEG modules 450 are available. The output of the combiner 418 is connected to an in-home RF connector 466, which in a

preferred embodiment is an F-connector. The connection between the in-home RF connector 466 and the splitter 177 is provided by the gateway-splitter connection 210, which in a preferred embodiment is a coaxial cable.

5       An optional CATV module 480 can be inserted into the gateway 200 to allow for mapping of off-air or cable video channels from their original frequencies to new frequencies for in-home distribution. The remote control unit 442 can control the channel selection and mapping via control bus 422 which is  
10       connected to the CATV module 480. Either a hand-held IR remote control or a wireless remote control can be used to change the channel mapping of the CATV module 480.

      A front panel interface 462 provides for connectivity between front panel controls (buttons) and the microprocessor  
15       434. Through the front panel interface 462 the user can make channel changes as well as changing the configuration of the channels transmitted on the in-home coaxial network.

      The telephony module 454 transmits and receives information from the TDM bus 420 and produces an analog telephone signal  
20       which is compatible with a telephone 194. The interface for the telephone 194 is a telephone jack 468, which in a preferred embodiment is an RJ-11 jack.

      FIG. 5 illustrates a method of controlling the gateway 200 based on the use of a wireless remote 500 which transmits a UHF  
25       signal to the UHF receiver 470 illustrated in FIG. 4.

### **III. Gateway with point-to-point in-home coaxial wiring**

      FIG. 6 illustrates a gateway 200 which can be used in homes where there is point-to-point in-home coaxial cable wiring, and

where the gateway 200 can be located near the point where the coaxial wiring originates.

The gateway 200 shown in FIG. 6 has an main MPEG processor 430 which is capable of decompressing multiple MPEG streams. In a preferred embodiment, main MPEG processor 430 can decompress three video streams simultaneously, and generates three S-video signals which are available on an S-video bus 620. TV modules 654 can receive any of the S-video signals from the S-video bus 620, and modulate the video signal onto an appropriate channel for reception by a television 199 which is connected to that TV module 654 via coaxial cable and a TV connector 630.

The RF pass-through 464 and the CATV module 480 are used to map off-air broadcast or CATV signals to S-video, which can subsequently be transmitted to any of the televisions 199 connected to the TV connectors 630 or the S-video connector 474.

In the embodiment illustrated in FIG. 6, control of the gateway 200 from locations in the residence 190 is accomplished by means of return signals transmitted on the point-to-point in-home coaxial cable wiring. Return signals from remotes are received at the TV connector 630, and a diplexor 640 is used to separate the return signals from the forward signals. The return signals from TV #1 are transmitted on TV1 return line 642 to the remote control block 442, and return signals from TV #2 are transmitted on TV2 return line 644 to the remote control block 442.

FIG. 7 further illustrates a method of remote control using the coaxial cable return, in which an IR receiver 710 which is associated with a television 199 receives IR signals from an IR remote 700, and converts the optical signal to an electrical signal which is transmitted over the coaxial cable to the remote



control block 442 of FIG. 6 via the diplexor 640 and TV1 return 642 or TV2 return 644. Only a simple signaling protocol between the IR receiver 710 and the remote control block 442 is required, and the IR receiver functionality can be easily placed in the television 199.

Although this invention has been illustrated by reference to specific embodiments, it will be apparent to those skilled in the art that various changes and modifications may be made which clearly fall within the scope of the invention.

The invention is intended to be protected broadly within the spirit and scope of the appended claims.

## Claims

What is claimed is:

1. In a residential environment capable of having televisions locatable in at least two separate locations, a method of decoding and distributing video signals from a residential gateway, the method comprising:

receiving at least one channel select command from at least one remote control device associated with a respective at least one television, wherein the at least one channel select command is received at a receiver within the residential gateway;

receiving a video signal from a telecommunications network in response to the received at least one channel select command;

constructing, from the video signal, at least one series of video packets corresponding to the at least one channel select command;

transporting the at least one series of video packets over a video packet bus to at least one video decoder;

decoding the at least one series of video packets to produce at least one television signal, the decoding performed by the at least one video decoder; and

transmitting the at least one television signal to the at least one television.

2. The method of claim 1, wherein the telecommunications network is a digital network and the video signal is a digital video signal.

3. The method of claim 1, wherein the at least one television signal is an analog television signal.

4. The method of claim 1, wherein the video packets are MPEG video packets, the video packet bus is an MPEG bus, and the video decoder is an MPEG video decoder.

5. The method of claim 1, wherein the receiver within the residential gateway is a wireless receiver which receives channel select commands transmitted from wireless remote control devices associated with remotely located televisions.

6. The method of claim 5, wherein the wireless receiver is a UHF receiver that receives the channel select commands as UHF signals from UHF remote control devices associated with the remotely located televisions.

7. The method of claim 1, wherein the receiver within the residential gateway is an optical receiver which receives channel select commands from an optical remote control device associated with a television located in close proximity to the residential gateway.

8. The method of claim 7, wherein the optical receiver is an infrared receiver that receives the channel select commands as infrared signals from a infrared remote control device associated with the television located in close proximity to the residential gateway.

9. The method of claim 1, wherein said receiving at least one channel select command includes receiving channel select commands from remotely located televisions via a wireless receiver within the residential gateway and channel select commands from a television in close proximity to the residential gateway via an optical receiver within the residential gateway.

10. The method of claim 1, wherein the at least one video decoder includes a main video decoder.

11. The method of claim 10, wherein the at least one video decoder further includes at least one insertable video decoder.

12. The method of claim 10, wherein the main video decoder decodes the video signal to produce a television signal having an S-video format.

13. The method of claim 10, wherein the television signal produced by the main video decoder is transmitted to a television that is located in close proximity to the residential gateway.

14. The method of claim 10, wherein the main video decoder is capable of decoding video signals associated with three separate channels.

15. The method of claim 1, wherein said decoding the at least one series of video packets includes

decoding video packets associated with a channel select command from a television located in close proximity to the residential into a television signal having a first format; and

decoding video packets associated with channel select commands from televisions remotely located from the residential

gateway into television signals having a second format different from the first format.

16. A residential gateway for distributing video signals to a plurality of televisions locatable within at least two separate locations in a residential environment, said residential gateway comprising:

a receiver for directly receiving channel select commands from remote control devices associated with the televisions;

a network interface module for receiving signals, including video signals, from a telecommunications network, wherein the received video signals correspond to the channel select commands;

means for constructing at least one series of video packets from the received video signals;

a plurality of video processors for decoding the at least one series of video packets to produce at least one television signal; and

a video packet bus for transporting the at least one series of video packets to said plurality of video processors.

17. The residential gateway of claim 16, wherein the telecommunications network is a digital network and the video signal is a digital video signal.

18. The residential gateway of claim 16, wherein the at least one television signal is an analog television signal.

19. The residential gateway of claim 16, wherein said video packet bus is an MPEG bus and said plurality of video processors are MPEG video decoders.

20. The residential gateway of claim 16, wherein said receiver is a wireless receiver which receives channel select commands transmitted from wireless remote control devices associated with remotely located televisions.

21. The residential gateway of claim 20, wherein said wireless receiver is a UHF receiver that receives the channel select commands as UHF signals from UHF remote control devices associated with the remotely located televisions.

22. The residential gateway of claim 16, wherein said receiver is an optical receiver which receives channel select commands from an optical remote control device associated with a television located in close proximity to the residential gateway.

23. The residential gateway of claim 22, wherein said optical receiver is an infrared receiver that receives the channel select commands as infrared signals from a infrared remote control device associated with the television located in close proximity to the residential gateway.

24. The residential gateway of claim 16, wherein said receiver includes

a wireless receiver for receiving channel select commands transmitted from wireless remote control devices associated with remotely located televisions; and

an optical receiver for receiving channel select commands from an optical remote control device associated with a television located in close proximity to the residential gateway.

25. The residential gateway of claim 16, wherein said plurality of video processors includes a main video decoder.

26. The residential gateway of claim 25, wherein said plurality of video processors further includes at least one insertable video decoder.



27. The residential gateway of claim 25, wherein said main video decoder decodes the video signal to produce a television signal having an S-video format.

28. The residential gateway of claim 25, wherein said main video decoder produces a television signal and transmits the television signal to a television located in close proximity to the residential gateway.

29. The residential gateway of claim 25, wherein said main video decoder is capable of decoding video signals associated with three separate channels.

30. The residential gateway of claim 16, wherein said plurality of video processors includes

a main video decoder for decoding video packets associated with a channel select command from a television located in close proximity to the residential into a television signal having a first format; and

at least one insertable video decoder for decoding video packets associated with channel select commands from televisions

remotely located from the residential gateway into television signals having a second format different from the first format.

31. A method for receiving and decoding signals from a telecommunications network at a residential gateway, and transmitting decoded signals from the residential gateway to a plurality of devices including multiple televisions, the method comprising:

connecting the residential gateway to the telecommunications network and to each of the plurality of devices so that all communications between the devices and the telecommunications network must pass through the residential gateway;

selecting a television channel to view for at least one of the multiple televisions by programming an associated remote control device to transmit a channel select command, wherein the channel select commands are received by a receiver within the residential gateway;

transmitting the at least one channel select command to the telecommunications network;

receiving a video signal from the telecommunications network corresponding to the at least one channel select command;

converting the video signal into at least one series of video packets;

decoding the at least one series of video packets into at least one television signal, the decoding performed by at least one of a plurality of video decoders; and

transmitting the at least one television signal to the appropriate television.

32. The method of claim 31, wherein said connecting the residential gateway includes connecting the residential gateway to a first television located in close proximity to the residential gateway with S-video cables.

33. The method of claim 31, wherein said selecting a television channel includes selecting a television channel for remotely located televisions by programming associated wireless remote control devices, the associated wireless remote control devices transmitting the channel select command as wireless signals to the residential gateway, the wireless signals being received by a wireless receiver within the residential gateway.

34. The method of claim 33, wherein the wireless remote control devices are UHF remote control devices, the wireless signals are UHF signals and the wireless receiver is a UHF receiver.

35. The method of claim 31, wherein said selecting a television channel includes selecting a television channel for remotely located televisions by programming associated remote control devices to transmit the channel select commands to the remotely located televisions, the remotely located televisions transmitting the channel select commands to the residential gateway.

36. The method of claim 35, wherein the associated remote control devices are infrared remote control devices.

37. The method of claim 31, wherein said connecting the residential gateway includes connecting remotely located televisions to associated receivers located in close proximity to the remotely located televisions and connecting the associated receivers to the residential gateway.

38. The method of claim 37, wherein said selecting a television channel includes selecting a television channel for the remotely located televisions by programming associated remote control devices, the associated remote control devices transmitting the channel select commands to the associated

receivers, the associated receivers transmitting the channel select commands to the residential gateway.

39. The method of claim 38, wherein the associated remote control devices are infrared remote control devices and the associated receivers are infrared receivers.

40. The method of claim 31, wherein said selecting a television channel includes selecting a television channel for a television located in close proximity to the residential gateway by programming an optical remote control device, the optical remote control device transmitting the channel select command as an optical signal to the residential gateway, the optical signals being received by an optical receiver within the residential gateway.

41. The method of claim 40, wherein the optical receiver is an infrared receiver, the optical signals are infrared signals, and the optical remote control device is an infrared remote control device.

42. The method of claim 31, wherein the plurality of video decoders includes a main video decoder.

43. The method of claim 42, wherein the plurality of video decoders further includes at least one insertable video decoder.

44. The method of claim 42, wherein the main video decoder decodes the series of video packets to produce a television signal having an S-video format.

45. The method of claim 42, wherein the television signal produced by the main video decoder is transmitted to a television that is located in close proximity to the residential gateway.

46. The method of claim 42, wherein the main video decoder is capable of decoding video signals associated with three separate channels.

47. The method of claim 31, wherein said decoding the at least one series of video packets includes

decoding video packets associated with a channel select command from a television located in close proximity to the residential into a television signal having a first format; and

decoding video packets associated with channel select commands from televisions remotely located from the residential

gateway into television signals having a second format different from the first format.

48. A residential gateway for receiving and decoding signals from a telecommunications network and transmitting decoded signals to a plurality of devices including multiple televisions, the residential gateway comprising:

connectors for connecting the plurality of devices to the residential gateway;

a receiver for directly receiving channel select commands from remote control devices associated with the multiple televisions;

a network interface module for transmitting signals, including channel select commands, to the telecommunications network and receiving signals, including video signals, from the telecommunications network;

means for converting the video signals into series of video packets;

video decoders for decoding the series of video packets into television signals corresponding to the channel select commands, and transmitting the television signals to the corresponding televisions.

49. The residential gateway of claim 48, wherein said connectors include an S-video connector for connecting a television located in close proximity to the residential gateway to the residential gateway.

50. The residential gateway of claim 48, wherein said receiver is a wireless receiver for receiving channel select commands from wireless remote control devices.

51. The residential gateway of claim 50, wherein said wireless receiver is a UHF receiver and the wireless remote control devices are UHF remote control devices.

52. The residential gateway of claim 50, wherein the wireless remote control devices are used by remotely located televisions to transmit the channel select commands to the residential gateway.

53. The residential gateway of claim 48, wherein said receiver is an optical receiver for receiving channel select commands from an optical remote control device.



54. The residential gateway of claim 53, wherein said optical receiver is a infrared receiver and the optical remote control device is an infrared remote control device.

55. The residential gateway of claim 53, wherein the optical remote control device is used by a television located in close proximity to the residential gateway to transmit the channel select commands to the residential gateway.

56. The residential gateway of claim 48, wherein said receiver includes

an optical receiver for receiving channel select commands from an optical remote control device; and

a wireless receiver for receiving channel select commands from wireless remote control devices.

57. The residential gateway of claim 48, wherein said video decoders include a main video decoder.

58. The residential gateway of claim 57, wherein said video decoders further include at least one insertable video decoder.

59. The residential gateway of claim 57, wherein said main video decoder decodes the video packets to produce a television signal having an S-video format.

60. The residential gateway of claim 57, wherein said main video decoder produces a television signal and transmits the television signal to a television located in close proximity to the residential gateway.

61. The residential gateway of claim 57, wherein said main video decoder is capable of decoding video signals associated with three separate channels.

62. The residential gateway of claim 48, wherein said plurality of video processors includes

a main video decoder for decoding video packets associated with a channel select command from a television located in close proximity to the residential into a television signal having a first format; and

at least one insertable video decoder for decoding video packets associated with channel select commands from televisions

remotely located from the residential gateway into television signals having a second format different from the first format.

63. The residential gateway of claim 48, further comprising a remote control module for processing channel select commands.

64. The residential gateway of claim 48, further comprising a telephone module for receiving voice signals from the telecommunications network and converting the voice signals to a telephone signal compatible with a telephone connected to the residential gateway.

65. The residential gateway of claim 48, further comprising a data module for receiving data signals from the telecommunications network and converting the data signals to a computer signal compatible with a computer connected to the residential gateway.

66. The residential gateway of claim 48, further comprising a DAVIC module for receiving signals from the telecommunications network and transmitting the signals to a device connected to the residential gateway that can communicate directly with the telecommunications network.

67. In a residential environment having at least two televisions, a first television locatable in close proximity to a residential gateway and a second television remotely locatable from the residential gateway, a method of distributing video signals to the televisions from the residential gateway, the method comprising:

receiving channel select commands including a first channel select command directly from an optical remote control device associated with the first television at an optical receiver within the residential gateway, and a second channel select command from a second remote control device associated with the second television;

receiving, at a network interface module within the residential gateway, a video signal from a telecommunications network;

transporting, over a video signal bus, the received video signal to a video processor located within the residential gateway;

processing the transported video signal to produce a first television signal corresponding to the first channel select command and a second television signal corresponding to the second channel select command; and

transmitting the first television signal to the first television and the second television signal to the second television.

68. The method of claim 67, wherein said transmitting the first television signal includes transmitting the first television signal having an S-video format.

69. The method of claim 67, wherein said receiving channel select commands includes receiving the second channel select command directly from a wireless remote control device associated with the second television at a wireless receiver within the residential gateway.

70. The method of claim 67, wherein the video processor includes a main video processor and a secondary video module and said processing the transported video signal includes processing the video signal at the main video processor to produce the first television signal having a S-video format and processing the video signal at the secondary video module to produce the second television signal.

71. A residential gateway for decoding and distributing video signals received from a telecommunications network to at least two televisions, a first television locatable in close proximity to the residential gateway and a second television remotely locatable to the residential gateway, said residential gateway comprising:

a receiver for directly receiving channel select commands from a first remote control device associated with the first television;

a remote control module for processing channel select commands from the first television and the second television;

a network interface module for receiving video signals from a telecommunications network, wherein the received video signals correspond to the channel select commands processed by the remote control module; and

a video processor for processing the received video signals to produce a first television signal associated with the first television and a second television signal associated with the second television.

72. The residential gateway of claim 71, wherein said receiver is an optical receiver that receives the channel select

commands from an optical remote control device associated with the first television.

73. The residential gateway of claim 71, further comprising a wireless receiver for receiving channel select commands directly from a wireless remote control device associated with the second television.

74. The residential gateway of claim 71, wherein said video processor includes a main MPEG processor that constructs MPEG streams from the received video signals.

75. The residential gateway of claim 74, wherein said main MPEG processor is capable of simultaneously decoding several MPEG streams corresponding to several channels.

76. The residential gateway of claim 75, further comprising modulators for modulating the television signals onto available channels for transmission to the televisions.

77. The residential gateway of claim 74, wherein said video processor further includes an MPEG module, and said main MPEG processor decodes the MPEG streams associated with the first

television and said MPEG module decodes the MPEG stream associated with the second television.

78. The residential gateway of claim 77, wherein the first television signal has an S-video format.

79. A residential gateway for decoding and distributing signals from a telecommunications network to a plurality of devices including multiple televisions, the residential gateway comprising:

a network interface module for communicating with the telecommunications network, wherein the network interface module receives signals, including video signals, from the telecommunications network and transmits signals, including channel select commands, to the telecommunications network;

a main MPEG processor for decoding video signals associated with a first television into a first television signal, wherein the first television is located in close proximity to the residential gateway, and the first television signal has an S-video format and is available to the first television via an S-video port;



an optical receiver for directly receiving the channel select commands from an optical remote control device associated with the first television; and

a bus for transferring signals between said network interface module and said main MPEG processor.

80. The residential gateway of claim 79, further comprising a wireless receiver for directly receiving channel select commands from a wireless remote control device associated with a second television, wherein the second television is located remotely from the residential gateway.

81. The residential gateway of claim 79, wherein said main MPEG processor constructs MPEG streams from the received video signals.

82. The residential gateway of claim 81, wherein said main MPEG processor is capable of simultaneously decoding several MPEG streams corresponding to several channels.

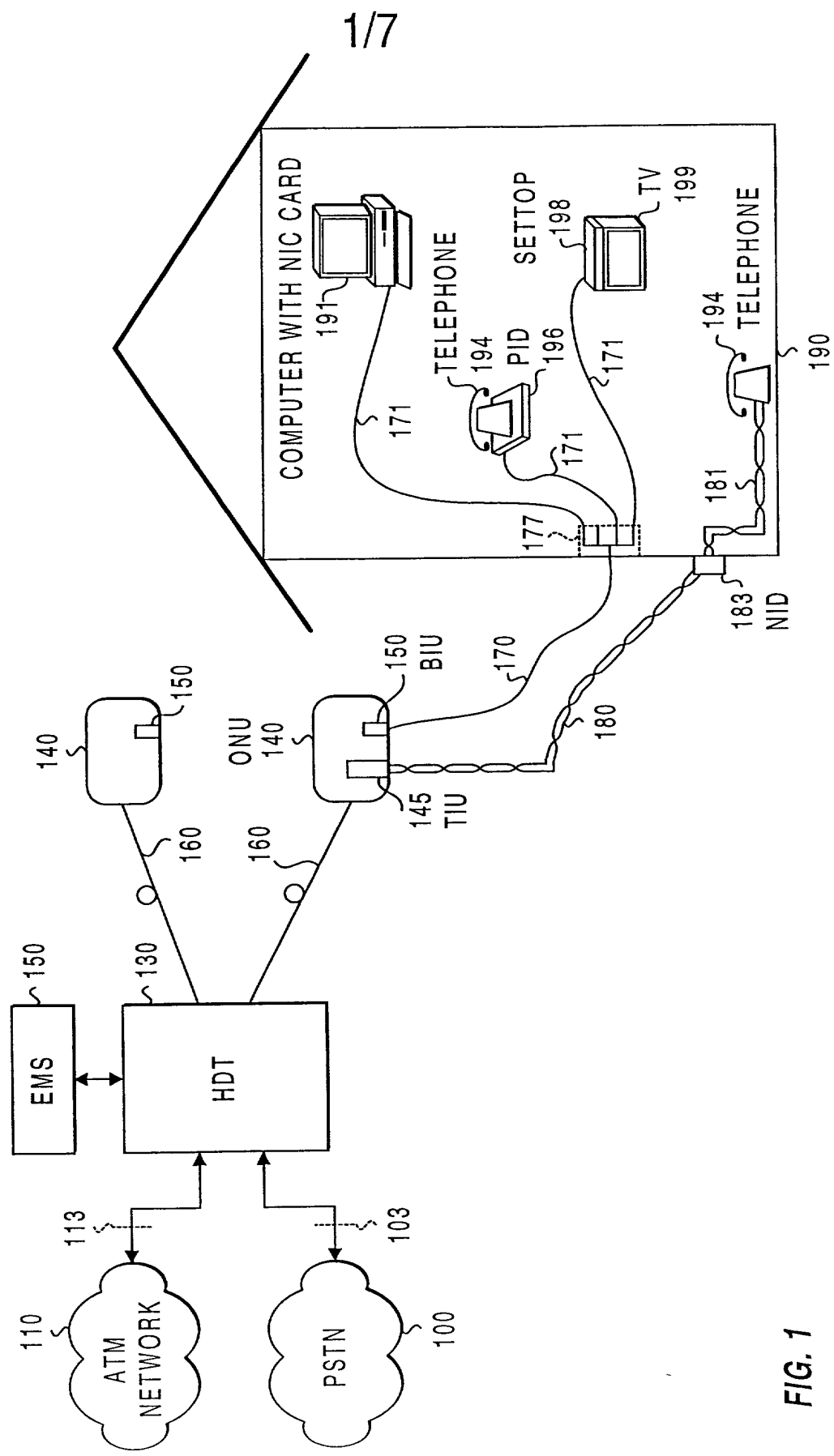
83. The residential gateway of claim 82, further comprising modulators for modulating the television signals onto available channels for transmission to the televisions.

84. The residential gateway of claim 79, further comprising MPEG modules for decoding video signals associated with remotely located televisions.

85. The residential gateway of claim 84, wherein the MPEG modules are insertable cards.

### **Abstract Of The Disclosure**

A residential gateway for distributing video, data and telephony services is disclosed. The gateway has a MPEG bus connected from a network interface module to a first and a second video processors. A microprocessor controls the first and second video processors by sending control signals across a control bus.



**FIG. 1**

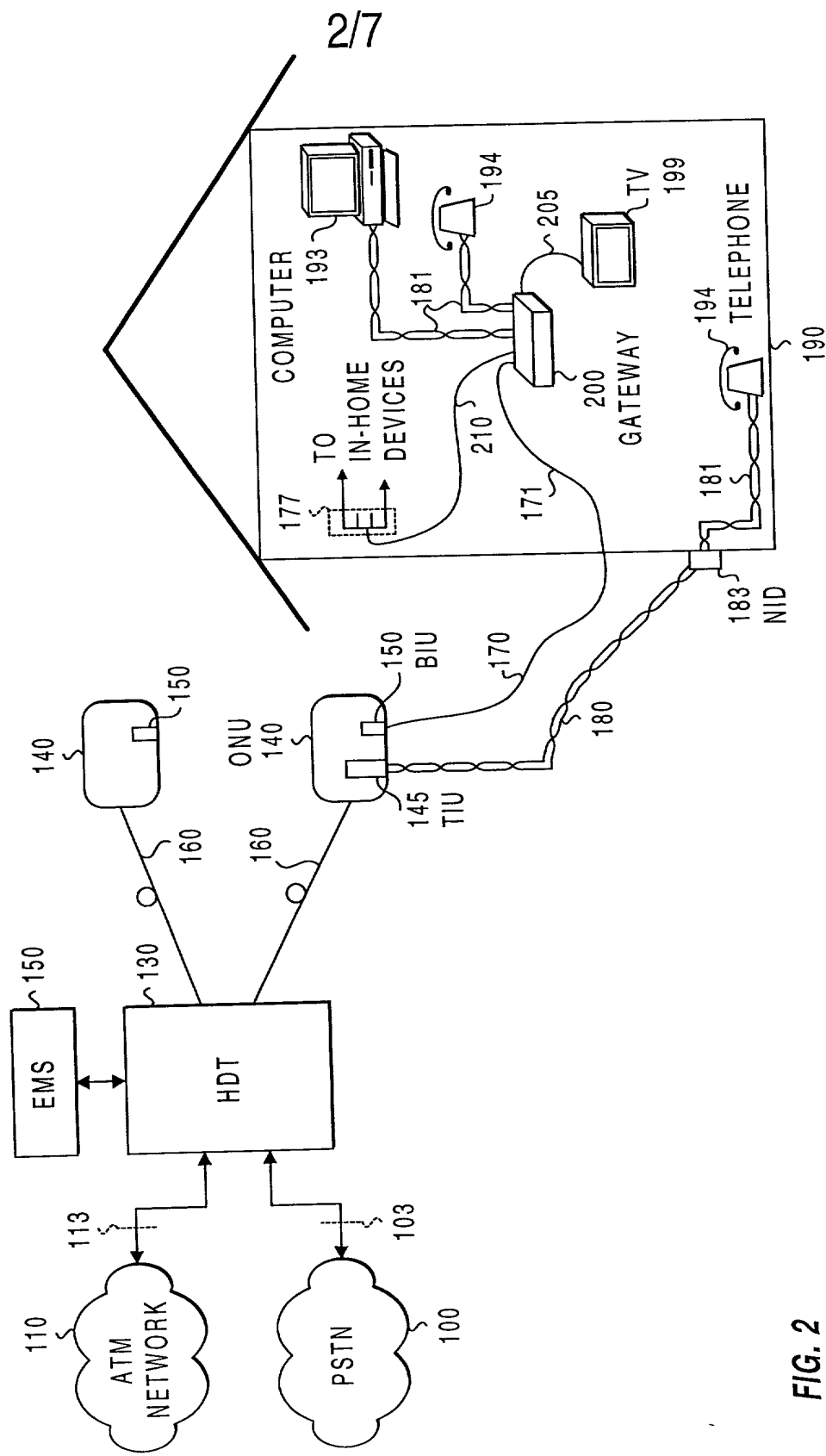
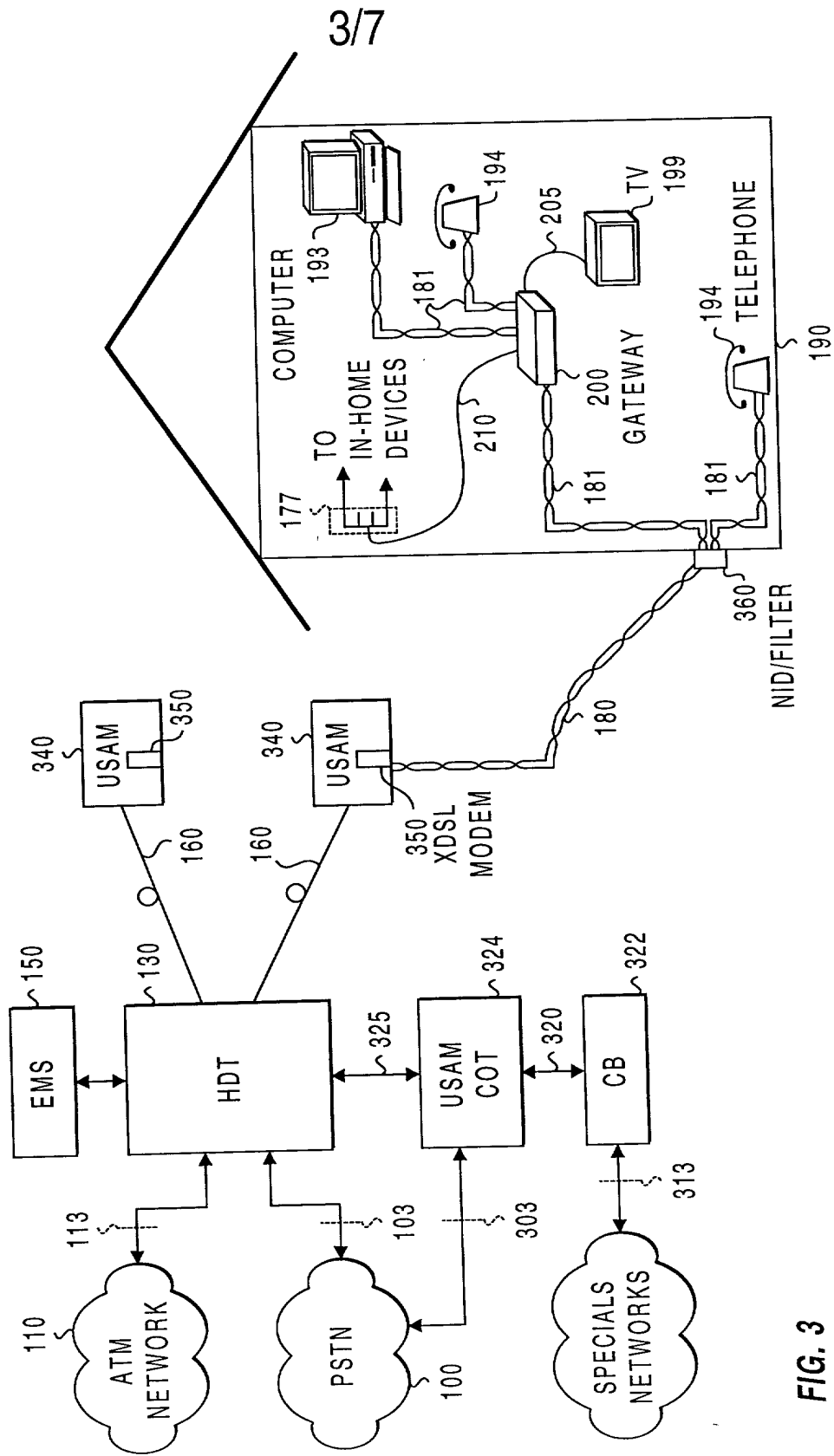


FIG. 2



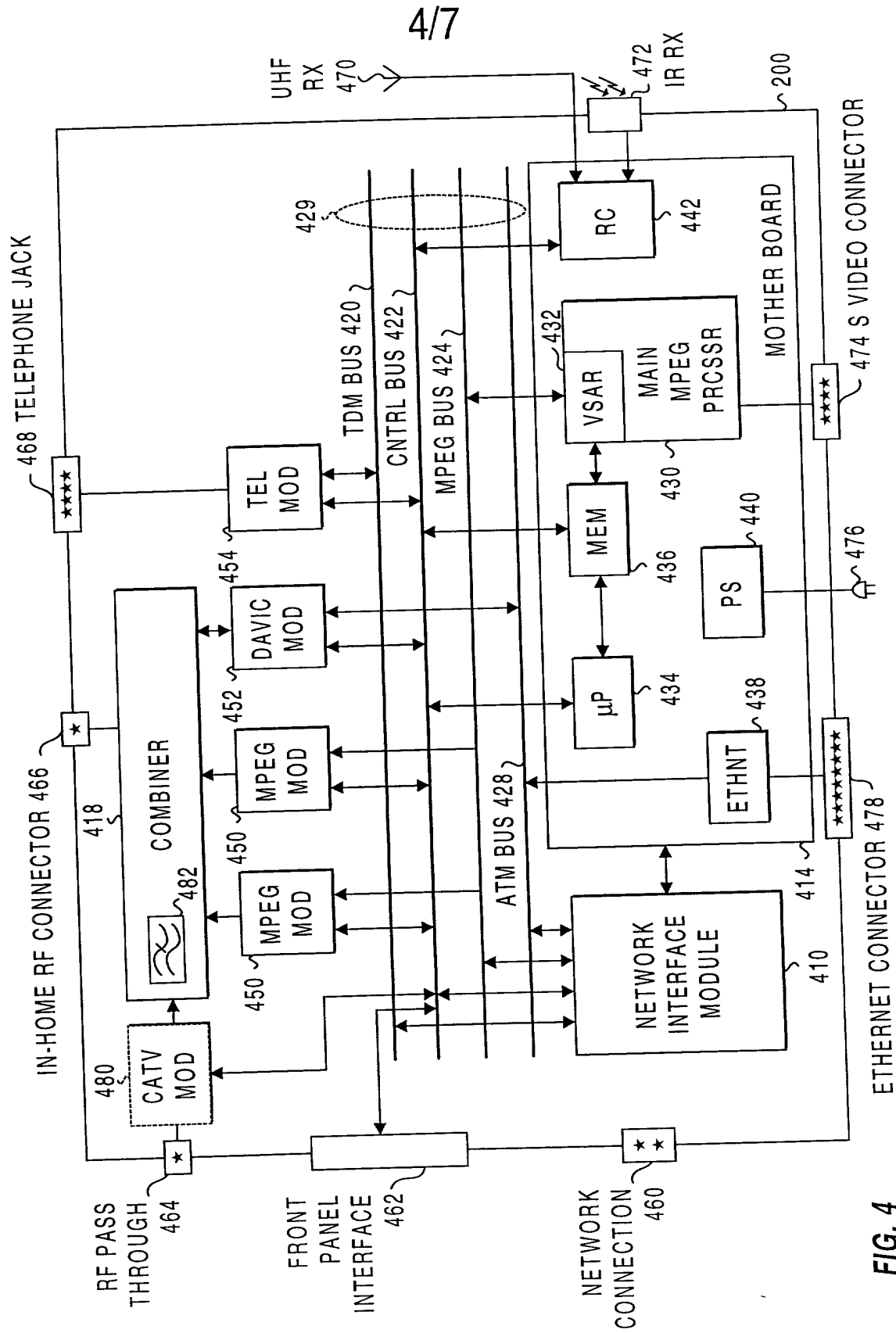
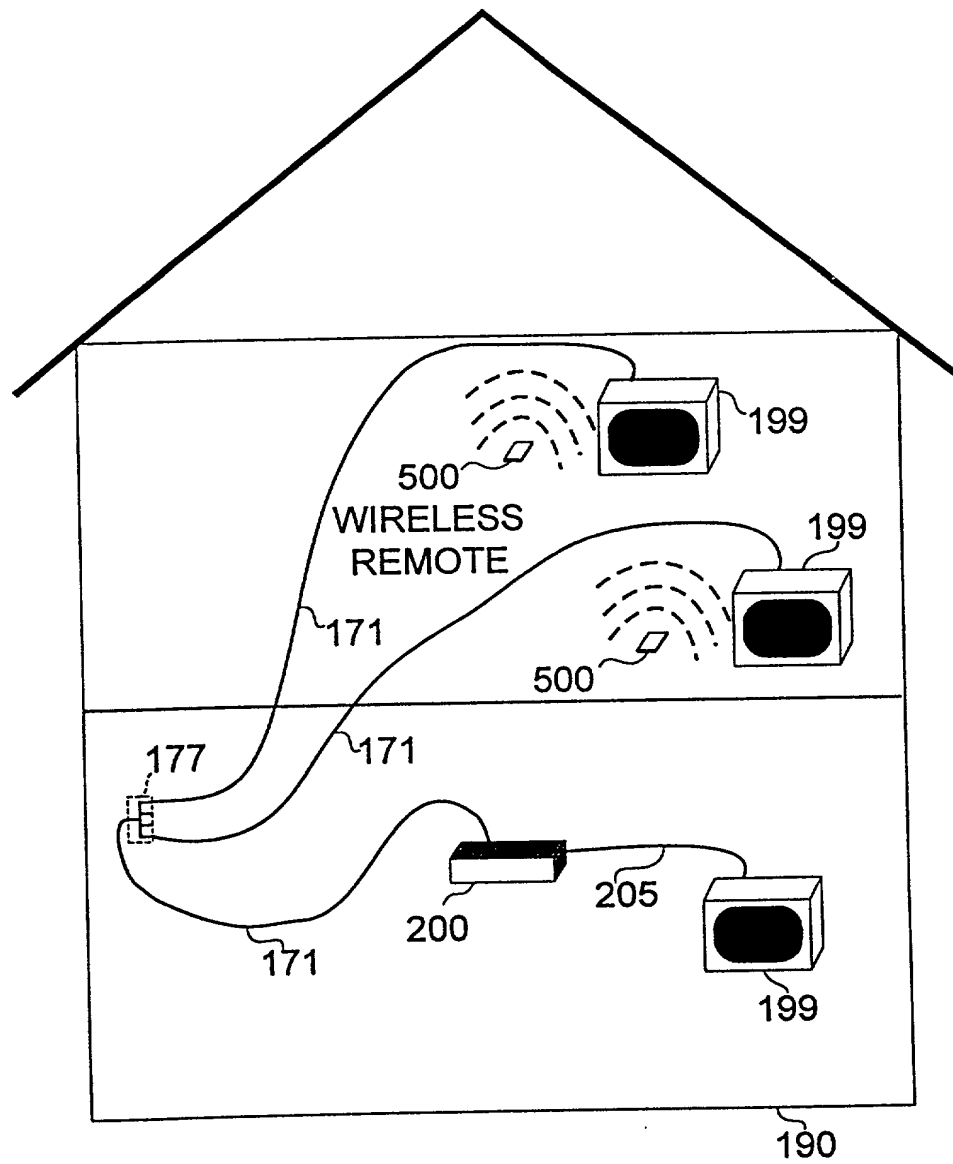


FIG. 4

**FIG. 5**



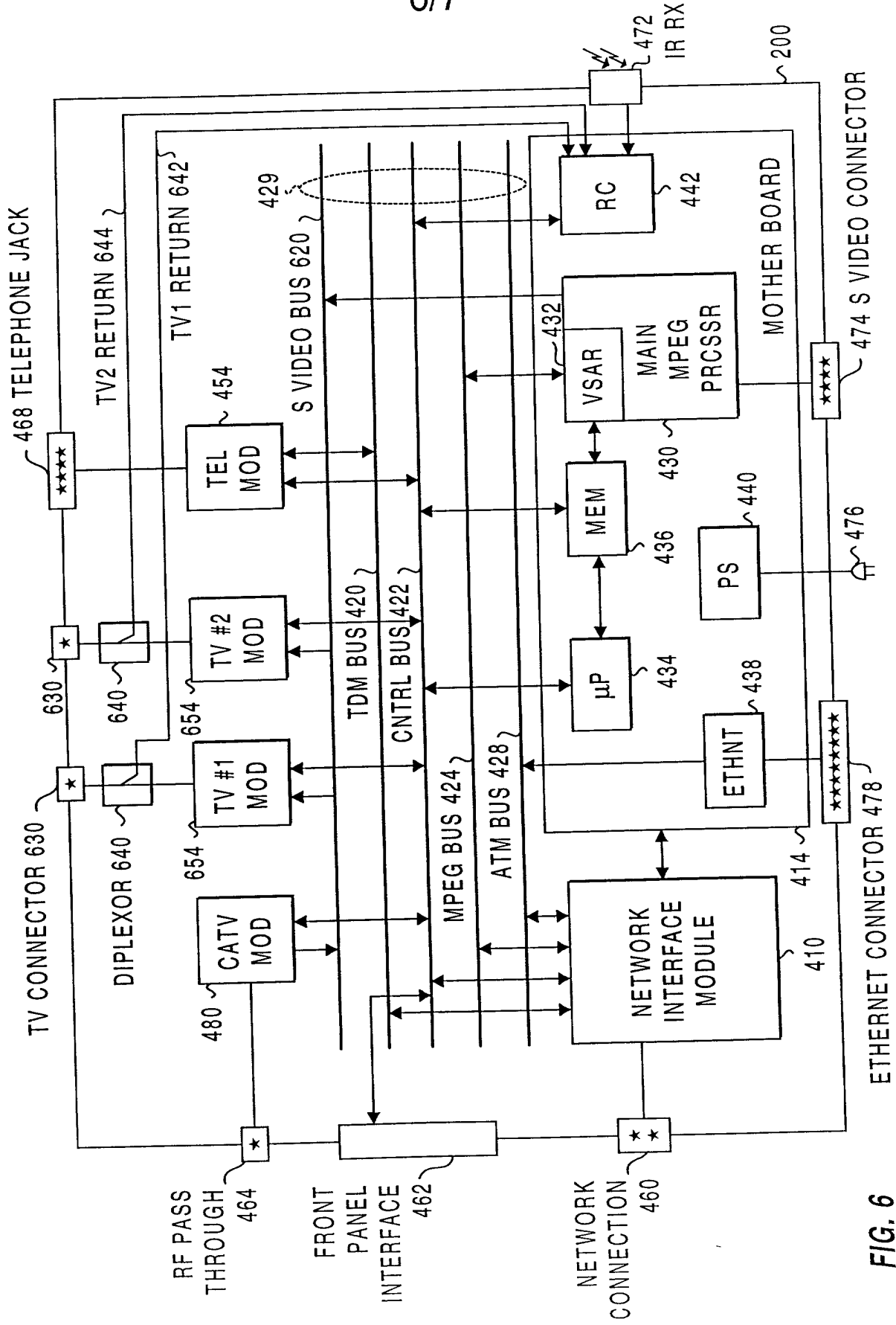


FIG. 6

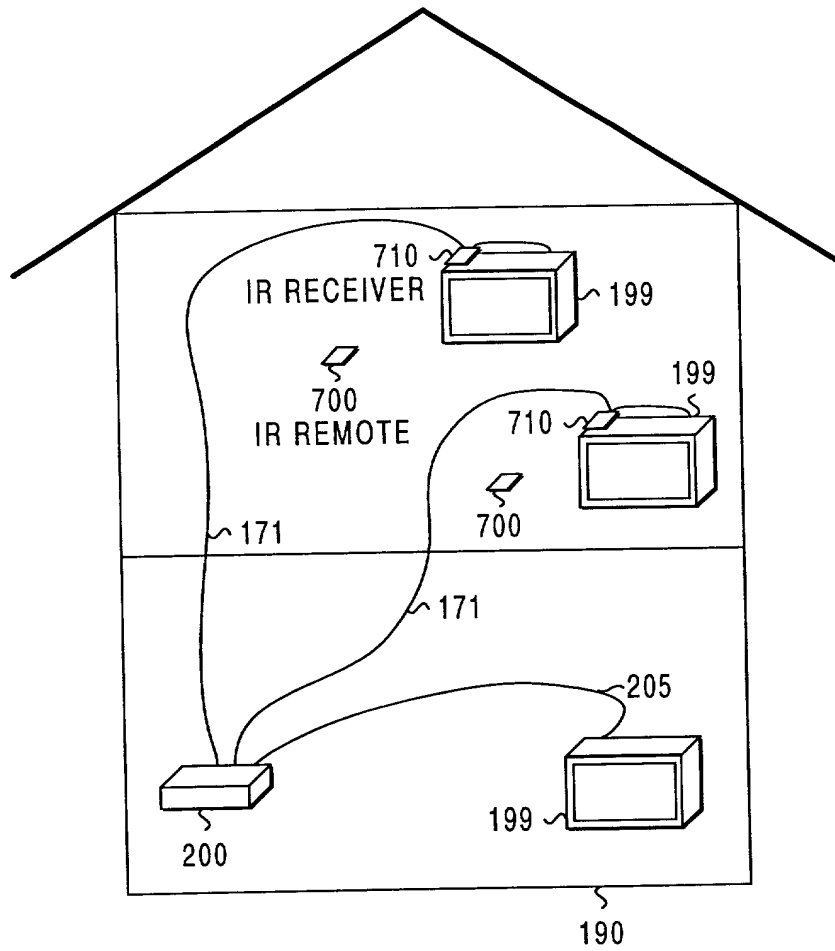


FIG. 7

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLN NUMBER 09/026,036	FILING DATE 02/19/98	FIRST NAMED INVENTOR EAMES	ATTY. DKT. NO. P722
TITLE VIDEO, DATA AND TELEPHONY GATEWAY		ART UNIT UNKNOWN	EXAMINER UNKNOWN

DECLARATION AND POWER OF ATTORNEY

☐ Declaration Submitted with Initial Filing, or ☒ Declaration Submitted after Initial Filing

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

VIDEO, DATA AND TELEPHONY GATEWAY

the specification of which

- ☐ is attached hereto, or  
☒ was filed on (DD/MM/YYYY) 19/02/1998 as United States Application Number or PCT International Application Number 09/026,036 and was amended on (DD/MM/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code §119 (a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (DD/MM/YYYY)	Priority Not Claimed	Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority sheet attached hereto.

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (DD/MM/YYYY)
60/038,276	19/02/1997

☐ Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s), or §365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Application Number	Parent Filing Date (DD/MM/YYYY)	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority sheet attached hereto.

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.


Name	Registration Number
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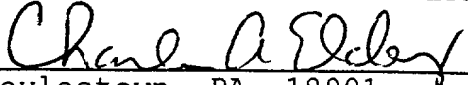
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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☐ Additional inventors are being named on supplemental sheet(s) attached hereto.